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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/583,529	05/10/2007	Xiaodong Li	612408002US1	4957

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SEKUL, MARIA LYNN	
ART UNIT	**PAPER NUMBER**
4124	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/583,529	LI ET AL.	
	Examiner	Art Unit	
	MARIA L. SEKUL	4124	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-4* is/are allowed.

6)☒ Claim(s) *5-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 June 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claim 7** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what “bits with higher significance in the CQI index” means. For purposes of examination, "bits with higher significance" is read as a “a lower code rate in the CQI index”.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 5-7** are rejected under 35 U.S.C. 102(e) as being anticipated by **Osseiran et al. (US Patent No. 7,437,166)**.

As to **claim 5**, Osseiran discloses “a receiver configured to receive adjusted data signals and associated control information transmitted by a signal transmitter” (the background and summary of Osseiran discloses a mobile radio user (receiver) that

receives pilot signals and sends CQI to the base station ("transmitter") which schedules data transmission to the receiver, **col. 1, lines 25-32**); and

"adaptation processes of the transmitter adjust at least one signal attributes selected from the group of modulation scheme, coding rates, pilot patterns, training symbols, power levels, spatial processing schemes, modulation constellation arrangements, transmitter antenna techniques, and subchannel configurations" (based on CQI, the transmitter adjusts the coding and modulation scheme ("modulation scheme, coding rates"); **col. 1, lines 25-32**);

"the adaptation processes are based on transmission channel quality information (CQI) or channel condition measurements fed back to the transmitter by the receiver" (mobile user sends CQI (feedback) to the transmitter, **col. 1, lines 28-30**); and

"the control information includes an indicator that refers to a specific set of adaptation processes known to both the receiver and the transmitter" (CQI is determined at the mobile user based on a measured channel transmission and is sent back to the transmitter, which knows the CQI and used it to assign the modulation and coding scheme; **col. 1, lines 28-31**);

and at the receiver "measure channel conditions based on the received signals (measure power level of the pilot signal, **col. 1, lines 25-29**); "compute CQI based on measured channel conditions, for use by the adaptation processes to determine schemes for transmission of subsequent signals and associated control information" (CQI is determined and sent to the transmitter to assign modulation and coding scheme (**col. 1, lines 28-32**); and

"feed back channel measurements, CQI, or both, to the signal transmitter, wherein the channel measurements and the CQI carry information about: received signal strength, average SINR (signal to interference plus noise ratio), variance in time, variance in frequency, variance in space, BER (bit error rate), FER (frame error rate), or MSE (mean square error), or any combination thereof" (the mobile user reports ("feed back") radio channel quality of a pilot channel ("received signal strength") to the transmitter, **col. 2, lines 25-37**).

As to **claim 6**, Osseiran discloses all of claim 5 and further discloses:

"the CQI for a particular receiver is periodically updated, even when there are no signals targeted to that receiver, by measuring the channel conditions from common broadcast signals or data signals targeted to other receivers" (the background and summary discloses that the mobile radio users periodically measure the radio channel quality of a pilot channel broadcast by a base station, and determines CQI and periodically reports back to the transmitter, col. 1, lines 25-30).

3. **Claim 8** is rejected under 35 U.S.C. 102(e) as being anticipated by **Iochi (US Patent No. 7,257,423)**.

As to **claim 8**, Iochi discloses a transmitter configured to:

"adapt and transmit signals on multiple sub-channels, wherein a modulation scheme, coding, training pilots, and power levels of the signals are all adjusted by adaptation processes that respond to transmission channel quality information (CQI) or channel condition measurements that are acquired by or made available to the transmitter". The background of Iochi discloses a method for adaptive modulation for

downlink packet data where the modulation scheme, code rate (coding), number of codes (training pilots) and power level are adjusted based on CQI (**Fig. 1 (Prior Art); lines 21-30**).

Iochi further discloses "transmit control information signals comprising information regarding the adaptation" (**Fig. 3** shows a base station transmitting control information, including CQI, pilot, power level); and

"the transmitter is further configured so that: the adaptation processes are user-based or subchannel- based" (the base station predicts channel quality based on CQI transmitted from a communication terminal (user) then adapts the number of codes, modulation scheme, code rate, and transmission power (**col. 1, lines 56-67)**; and

"the CQI is user-based or subchannel-based (CQI is reported by each communication terminal (user-based); **col. 1, lines 56-62**);

and the adaptation processes and CQI can change over time and differ from one time slot to another (the communication terminal performs demodulation, decoding and CRC detection in the time slot (**col. 2, lines 7-12**) in which packets for the terminal are assigned and transmits an ACK/NACK back to the transmitter with CQI information **(Fig. 4; col. 7, lines 16-27)** and the transmitter performs adaptation process based on CQI for each report from the terminal (**col. 2, lines 25-37**).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

> the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Osseiran et al. (US Patent No. 7,437,166)** in view of **Iochi (US Patent NO. 7,257,423)**.

As to **claim 7**, Osseiran discloses all of claim 5.

Osseiran does not disclose “during the feedback of the CQI, bits with higher significance in CQI index are protected with stronger error protection codes”.

Iochi discloses that when the code rate falls, or has a lower code rate ("bits with higher significance"), the redundancy is stronger, that is, stronger error protection codes are implemented (**col. 9, lines 1-14**).

Iochi and Osseiran are analogous art in that they both deal with adapting transmission parameters based on channel conditions. It would have been obvious to one skilled in the art at the time the invention was made to combine the error protection method in Iochi with the adaptation method in Osseiran in order to improve quality of a radio transmission on a channel with poor quality.

6. **Claims 9 and 10** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Iochi (US Patent NO. 7,257,423)**, as applied in claim 8, and further in view of **Dubuc et al. (US Patent No. 7,388,847)** (hereinafter Dubuc).

As to **claim 9**, Iochi teaches all of claim 8.

Iochi further teaches "the adaptation comprises adjusting modulation scheme, coding rates, pilot patterns, training symbols, power levels, spatial processing schemes, modulation constellation arrangements, transmitter antenna techniques, subchannel configurations, or any combination thereof" (The background of Iochi discloses a method for adaptive modulation for downlink packet data where the modulation scheme, code rate (coding), number of codes and power level are adjusted based on CQI (**Fig. 1 (Prior Art); lines 21-30**).

Iochi fails to teach adaptation processes in an OFDM (Orthogonal Frequency Division Multiplexing) system.

Dubuc teaches an OFDM system that applies adaptive modulation and coding schemes based on channel quality indicator (CQI) (**col. 2, lines 6-16**).

Dubuc and Iochi are analogous art in that they both pertain to adapting radio transmission parameters based on CQI. It would have been obvious to one skilled in the art at the time the invention was made to use the adaptive process of Iochi in an OFDM system as taught in Dubuc being that it provides improved quality of a radio transmission.

As to **claim 10**, Iochi discloses all of claim 8 and further discloses "the transmitter is a part of a base station, a mobile station, or both" (the transmitter function is described as part of a base station; **col. 1, lines 57-67 through col. 2, lines 1-6**).

7. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Iochi (US Patent NO. 7,257,423)** in view of **Dubuc et al (US Patent No. 7,388,847)**.

As to **claim 11**, Iochi discloses all of claim 8.

Iochi teaches using adaptive processes for transmissions and "an automatic repeat request (ARQ) process" (retransmission). The background of Iochi teaches that if the mobile detects an error, it sends a NACK and the base station retransmits the data (col. 2, lines 15-20), using ARQ techniques schemes which may apply different coding than the initial transmission (col. 1, lines 35-51).

Iochi does not teach an adaptive process to "adjust constellation mapping during transmission and retransmission in an automatic repeat request (ARQ) process; and determine a multiple-antenna technique, among available techniques, for transmission".

Dubuc teaches mapping of the bits ("constellation mapping") based on the chosen baseband modulation by applying mapping logic (**col. 5, lines 56-67**) and also teaches spacial diversity ("multiple-antenna technique") with space-time block code logic which processes incoming symbols and provide output corresponding to the number of transmit antennas. (**col. 6, lines 1-21)**.

Dubuc and Iochi are analogous art because they pertain to adapting radio transmission based on channel quality information received from the receiver. It would have been obvious to one skilled in the art at the time the invention was made to combine the adaptive constellation mapping and multiple-antenna technique in Dubuc with the adaptation process in Iochi because it further improves the quality of the radio transmission.

8. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Iochi (US Patent No. 7,257,423),** as applied to claim 8 above, and further in view of **Lakkis (US PGPub 2005/0201326)**.

As to **claim 12**, Iochi discloses all of claim 8.

Iochi does not teach "the subchannel configuration is adjusted according to deployment scenarios and is broadcast to all users".

Lakkis teaches that a channel is divided into sub-channels assigned to different communication devices within a cell. The base station transmits the sub-channel information to all communication devices, but each device processes only those frequencies or timeslots assigned to it (**Fig. 6; ¶ 43, 62**), and sub-channels can be

assigned based on channel conditions reported to the base station and transmission parameters adapted **(¶ 100, 112**).

9. **Claims 13 and 17-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Dubuc et al. (US Patent No. 7,388,847)** (hereinafter Dubuc) in view of **Iochi (US Patent NO. 7,257,423).**

As to **claim 13**, Dubuc discloses:

"multiple transmitters configured to transmit data and associated modification information processed using channel measurements or channel quality information (CQI) computed from channel measurements; multiple receivers configured to receive the data and the modification information" (**Fig. 2** show the multiple base stations ("transmitters") and multiple mobile users ("receivers"); *see* **col. 3, lines 21-26** discussing adapting modulation and coding ("modification information") based on CQI for transmission); and

Dubuc does not specifically disclose the configuration in which "the modification information, which includes modification of modulation schemes, coding specifics, training pilots, and power levels, is transmitted by an index value that identifies an explicit set of modulations known to the transmitter and to the receiver"; and "the channel measurements and the CQI reflect received signal strength, average SINR (signal to interference plus noise ratio), variance in time, variance in frequency, variance in space, BER (bit error rate), FER (frame error rate), MSE (mean square error), or any combination" (the CQI is based on the signal to interference ration that results in a frame error rate of the transmission; **col. 2, lines 33-48**).

The background of Iochi teaches a configuration for adaptive modulation of downlink packet data where the modulation scheme, code rate (coding), number of codes and power level are adjusted based on CQI (index value) (**Fig. 1 (Prior Art); lines 21-30**) and also where the CQI is based on the signal to interference ration that results in a frame error rate of the transmission (**col. 2, lines 33-48**).

Iochi and Dubuc are analogous art in that they both pertain to using CQI to adapt radio transmission parameters. It would have been obvious to use the configuration of Iochi with the adaptation processes in Dubuc in order to improve quality of the radio transmission.

As to **claim 17**, Dubuc discloses "a multi-transmitter multi-receiver multi-carrier communication network" (**Fig. 2, col. 3, lines 44-54**) comprising:

"means for adjusting at least one signal attributes selected from the group of modulation scheme, coding rates, pilot patterns, training symbols, power levels, spatial processing schemes, modulation constellation arrangements, transmitter antenna techniques, and subchannel configurations, at each transmission period, based on transmission channel condition information sent back by a receiver means of prior signals" (**col. 3, lines 21-26** discloses adapting modulation and coding ("modification information") based on CQI received from the mobile station for a previous transmission; the background of Dubuc further states that CQI information is continuously reported back to the base station from the mobile station; **col. 1, lines 25-34**);

"means for generating control information signal comprising adjustment information" (CQI, which is an indication of control information, is transmitted by the base station to the mobile station or from the mobile station to the base station (col. 9, lines 40-52); and

"means for transmitting an adjusted signal and the associated control information signal on a single channel or on separate channels" (**Fig. 5**; showing the base station uses the associated CQIs to schedule data for transmission and select appropriate coding and modulation for transmitting the data, col. 5, lines 33-41; **Fig. 6** showing the signal received at the mobile station and separating out the CQI and the data)

"means for receiving an adjusted signal and the associated control information signal" **(Fig. 6** showing the signal received at the mobile station and separating out the CQI and the data);

"means for measuring channel conditions based on the received adjusted and associated control information signals" and "means for computing channel quality information by utilizing the received adjusted and associated control information signals" (**Fig. 6,** the mobile station calculates CQI based on received information from the base station through channel variation analysis **(col. 9, lines 46-52**); and

"means for sending back, to a transmitter, the channel quality information, measured channel conditions, or both" (the background of Dubuc states that CQI information is continuously reported back to the base station from the mobile station, (**col. 1, lines 25-34**).

Dubuc does not explicitly disclose "means for indexing the adjustment information included in the control signal" or ""means for looking-up the adjustment details of the adjusted signal using an index value".

The background of Iochi teaches a configuration for adaptive modulation of downlink packet data where the modulation scheme, code rate (coding), number of codes (training pilots) and power level are adjusted based on CQI (index value) (**Fig. 1 (Prior Art); lines 21-30**) and also where the CQI is based on the signal to interference ration that results in a frame error rate of the transmission (**col. 2, lines 33-48**).

For the same reasons given in claim 13 above, it would have been obvious to use the table of Iochi with the adaptation processes in Dubuc in order to provide an index to the adaptation parameters being that the CQI is the basis for determining the transmission quality and associated parameters both known to the transmitter and receiver.

As to **claim 18**, Dubuc further discloses "the transmitter means and the receiver means are part of a base station, a mobile station, or both" (**Fig. 3**, showing a base station with both transmit and receive circuitry, (**col. 3, lines 60-66**) and **Fig. 4**, showing a mobile station with both transmit and receive circuitry (**col. 4, lines 30-35**) .

As to **claim 19**, Dubuc discloses a method, comprising:

"measuring transmission channel conditions" and "adapting at least modulation scheme, coding specifics, training-pilot particulars, and power levels for at least some transmission periods, based on the measured channel conditions" (**col. 3, lines 21-26** discloses adapting modulation and coding ("modification information") based on CQI

received from the mobile station for a previous transmission; the background of Dubuc states that CQI information is continuously reported back to the base station from the mobile station; **col. 1, lines 25-34**; and measurements required to determine the carrier-to-interference ration (CIR) and variation measure are measured a the mobile terminal to determine the CQI ; **col. 3, lines 35-40**) ;

"transmitting the adapted signal; and transmitting adaptation information by transmitting an indicator" (the base station receives the CQI, or information to determine the CQI, adapts the modulation and coding of the signal based on the control information; **col. 9, lines 36-52**).

Dubuc does not disclose that an "indicator signifies a specific set of adaptations selected from multiple sets of adaptations known to at least one receiver".

The background of Iochi teaches a configuration for adaptive modulation of downlink packet data where the modulation scheme, code rate (coding), number of codes (training pilots) and power level are adjusted based on CQI (index value) (**Fig. 1 (Prior Art); lines 21-30**) and also where the CQI is based on the signal to interference ration that results in a frame error rate of the transmission (**col. 2, lines 33-48**).

For the same reasons given in claim 13 above, it would have been obvious to use the table of Iochi with the adaptation processes in Dubuc in order to provide an index to the adaptation parameters being that the CQI is the basis for determining the transmission quality and associated parameters both known to the transmitter and receiver.

As to **claim 20**, Dubuc further discloses "the channel condition information is sent back by a receiver based on previously received adjusted and associated control information signals" (**col. 1, lines 25-34** discloses adapting modulation and coding ("modification information") based on CQI continuously received from the mobile station indicating the channel conditions).

10. **Claim 14-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Dubuc et al. (US Patent No. 7,388,847)** (hereinafter Dubuc) in view of in view of **Iochi (US Patent NO. 7,257,423)** as applied to claim 13, and further in view of **Petrakis (US Popup 2004/0142698**).

As to **claim 14**, Dubuc in view of Iochi discloses all of claim 13.

Iochi in view of Dubuc does not teach "the transmitters, the receivers, or both use predictive algorithms to predict current or future channel conditions based on previous channel conditions, and wherein the output of the predictive algorithms is used to select a scheme for current transmission".

Petrakis teaches a wireless transmit/receive device (WTRU) determining a CQI based on prediction of the channel quality at the time of the next anticipated downlink data transmission by making use of the past history of channel qualities to perform link adaptation (adapt modulation and coding schemes) (**Fig. 6**; **¶ 39**).

Pietraski and Dubuc in view of Chen in view of Ro are analogous art because they deal with determining the channel quality indicator (CQI) to apply adaptive modulation and coding techniques. It would have been obvious to one skilled in the art at the time the invention was made to use the predictive CQI method in Pietraski with

the CQI determination method in Dubuc in view of Iochi being that it resolves the issue of CQI delay, as noted in Pietraski, ¶ 39.

As to **claim 15**, Dubuc in view of Iochi discloses all of claim 13.

Dubuc further teaches "transmission of the channel measurements from a receiver to a transmitter employs an overlay scheme in which channel measurements are overlaid on data traffic without having negative impact on data transmission performance, and wherein the transmitter estimates channel profile in the time and/or the frequency domains based on the received channel measurements" (**Fig. 6** shows the breakdown of a receiver architecture for transmitting carrier-to-interference ratio (CIR) (122) overlayed with data; the CQI is based on CIR and a variation measure determined at the mobile terminal ("reciever"); **col. 3, lines 26-39**; the receiver sends either a CQI or other information sufficient for the base station ("transmitter") to create a CQI; **col. 8, lines 4-10**).

As to **claim 16**, Dubuc in view of Iochi discloses all of claim 13.

Dubuc further teaches "source coding compresses the modification information or the CQI, and error correction coding provides error protection for the compressed modification information or the CQI". **Fig. 4** shows the signal processing at the mobile station, described in col. 4, lines 50-61, in which the baseband processor encodes ("source coding") voice, data or control information (CQI) for transmission, which is sent to the transmit circuitry which modulates the signal accordingly. **Fig. 6** further shows that CRC ("error correction") was applied during transmission.

11. **Claim 21** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Dubuc et al. (US Patent No. 7,388,847)** (hereinafter Dubuc) in view of **Iochi (US Patent NO. 7,257,423)**, as applied to claim 19, and further in view of **Hashimoto et al. (US PGPub 2004/0022176)**.

As to **claim 21**, Dubuc in view of Iochi does not explicitly teach "directly related to the percentage of times a particular combination is used".

Hashimoto et al. discloses a configuration in which there is one pilot for each modulation scheme (**¶ 23**). If a modulation and coding scheme is used once, the pilot pattern associated with that scheme would also be used once, and the usage of the scheme would be a direct one-to-one relationship with the number of pilot patterns. Therefore, Hashimoto reads directly on this claim language.

Hashimoto and Dubuc in view of Iochi are analogous art in that they pertain to adapting radio transmission based on channel quality. It would have been obvious to one skilled in the art at the time the invention was made to associate the pilot with a modulation and coding scheme as in Hashimoto with the adaptation process in Dubuc in view of Iochi being that it improves quality of the transmission.

Allowable Subject Matter

12. Claims 1-4 are allowable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARIA L. SEKUL whose telephone number is (571)270-7636. The examiner can normally be reached on Monday - Friday 8:00-5:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lewis West can be reached on (571) 272-7859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MARIA L. SEKUL
Examiner
Art Unit 4124

/M. L. S./
Examiner, Art Unit 4124

/Lewis G. West/
Supervisory Patent Examiner, Art Unit 4124